

TMDL Development for Roses Creek

Lawrenceville, Virginia

April 2, 2003

What is a TMDL?

- A TMDL (Total Maximum Daily Load) establishes the maximum amount of an impairing substance or stressor that a waterbody can assimilate and still meet Water Quality Standards and allocates that load among pollution contributors.
- TMDLs are a tool for implementing State water quality standards. They are based on the relationship between pollution sources and in-stream water quality conditions.
- A TMDL addresses a single pollutant or stressor for each waterbody.

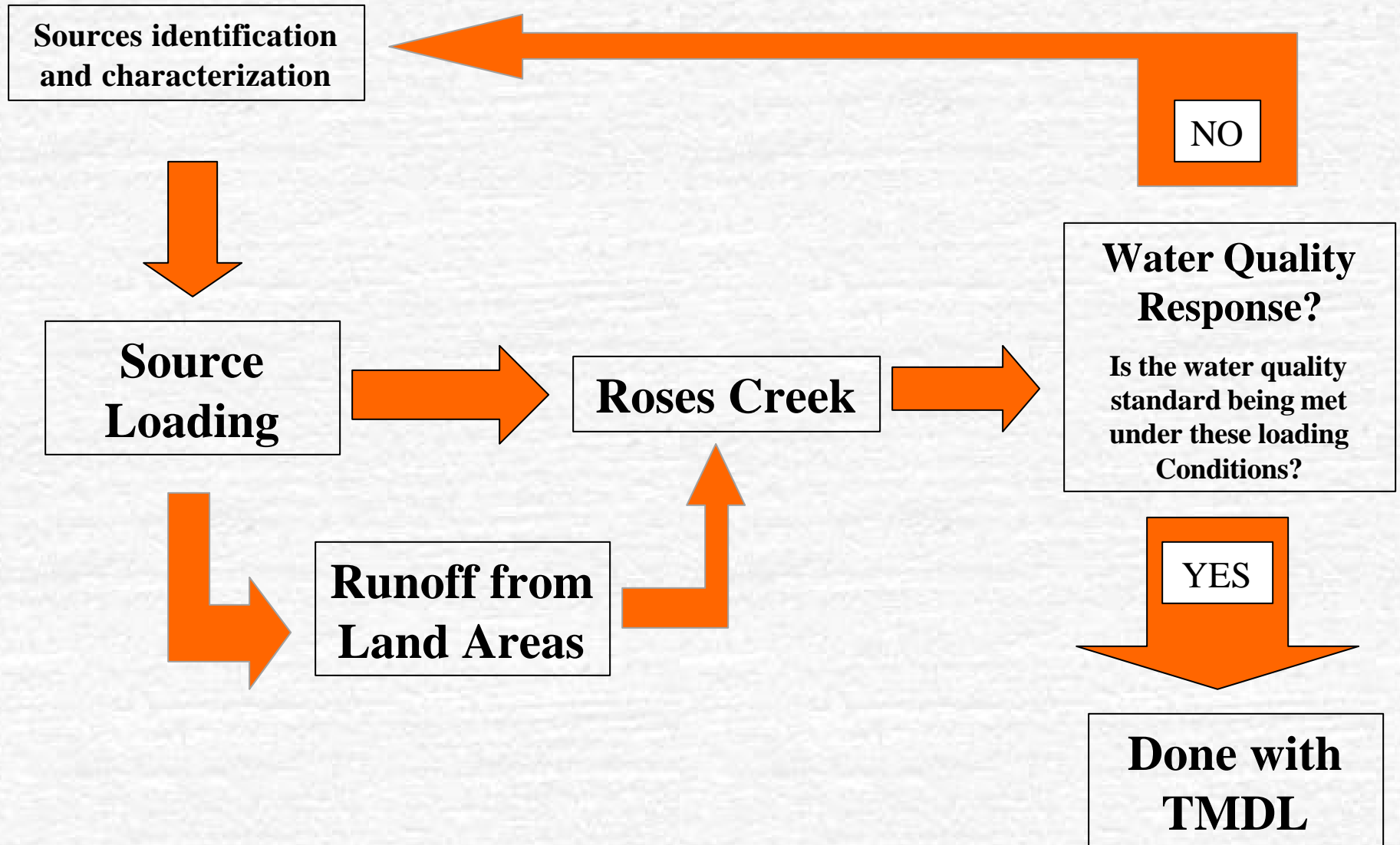
Which Waterbodies Require TMDLs?

Waterbodies require TMDLs when the pollution control requirements are not stringent enough to meet applicable Water Quality Standards.

How are TMDLs calculated?

- A TMDL is the sum of the allowed pollutant loads for point sources, non-point sources, a margin of safety, and projected growth (optional).
- $\text{TMDL} = \text{Point Sources} + \text{Nonpoint Sources} + \text{Margin of Safety}$

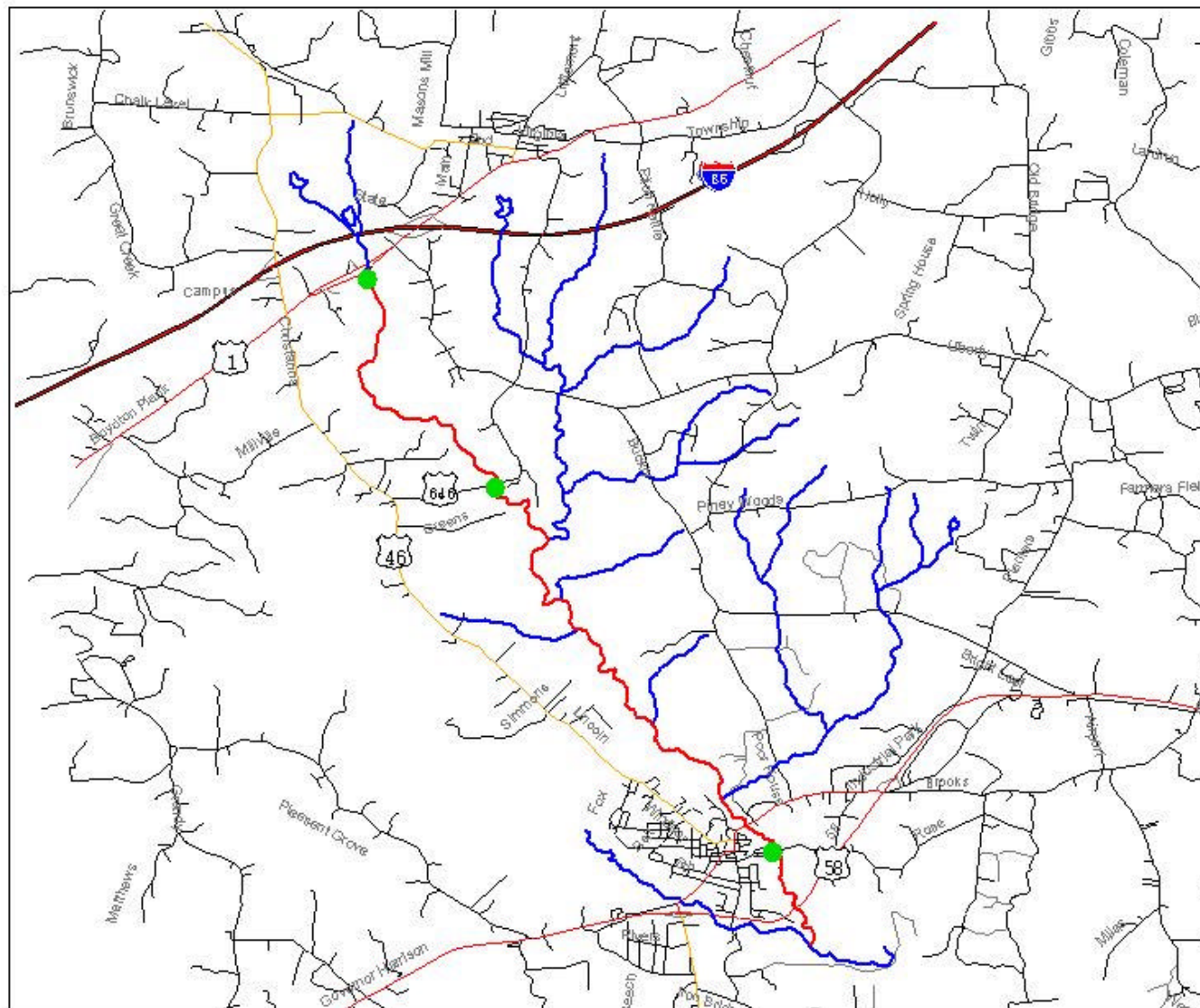
TMDL Process



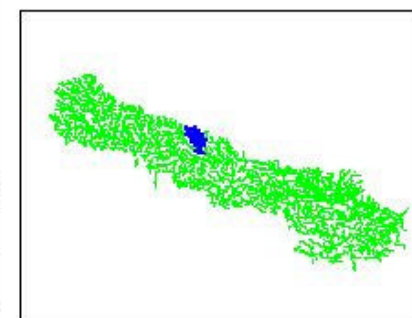
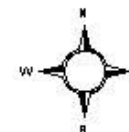
Objective:

To identify, obtain, and to characterize by quality and quantity all available data that could be used to develop the Bacteria and Benthic TMDLs for the listed segments of Roses Creek.

Roses Creek



- Monitoring Station
- Impaired Segment
- Roses Creek
- Streets**
- Highway
- Primary road
- Secondary road
- Local road
- Access road
- Ferry crossing
- Roads**



2 0 2 4 Miles

A scale bar indicating distances in miles, with markings for 2, 0, 2, and 4 miles.

Roses Creek Listed Segment

Fecal Coliform

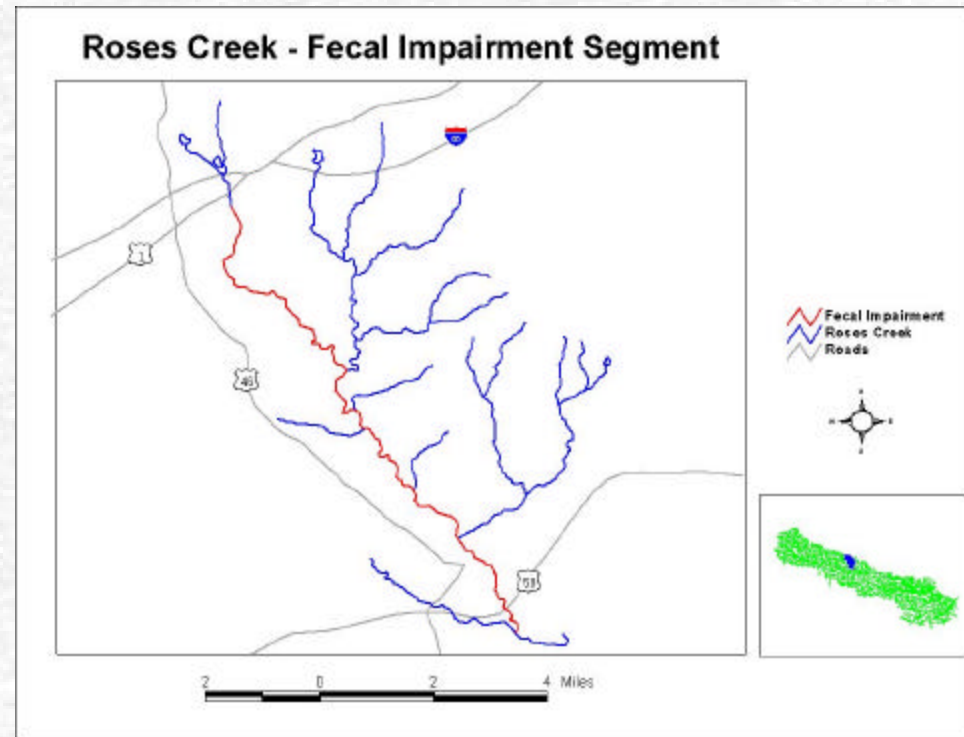
Based on the 1998 303(d) List:

Upstream Limit: Town of Alberta STP discharge

Downstream Limit: Great Creek confluence

Segment Size: 9.85 miles

Description: Fecal coliform bacteria caused the segment to fail meet the swimming goal.



Roses Creek Listed Segment

General Standard (Benthic)

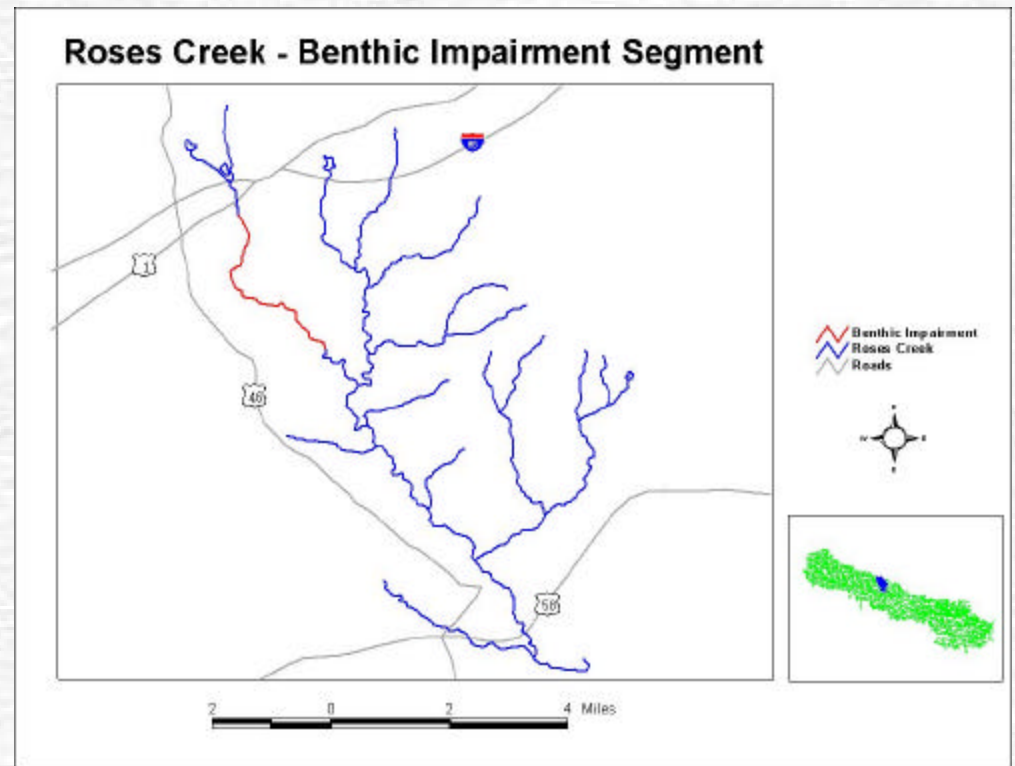
Based on the 1998 303(d) List

Upstream Limit: Town of Alberta STP discharge

Downstream Limit: Route 646 Bridge

Segment Size: 3.02

Description: A pollutant or a stressor caused the segment to fail supporting aquatic Life use.



Data and Information

- Categories of Data
 - Watershed Physiographic data
 - Weather Data
 - Potential Pollutant Sources
 - Water quality data
 - Stream Flow Data

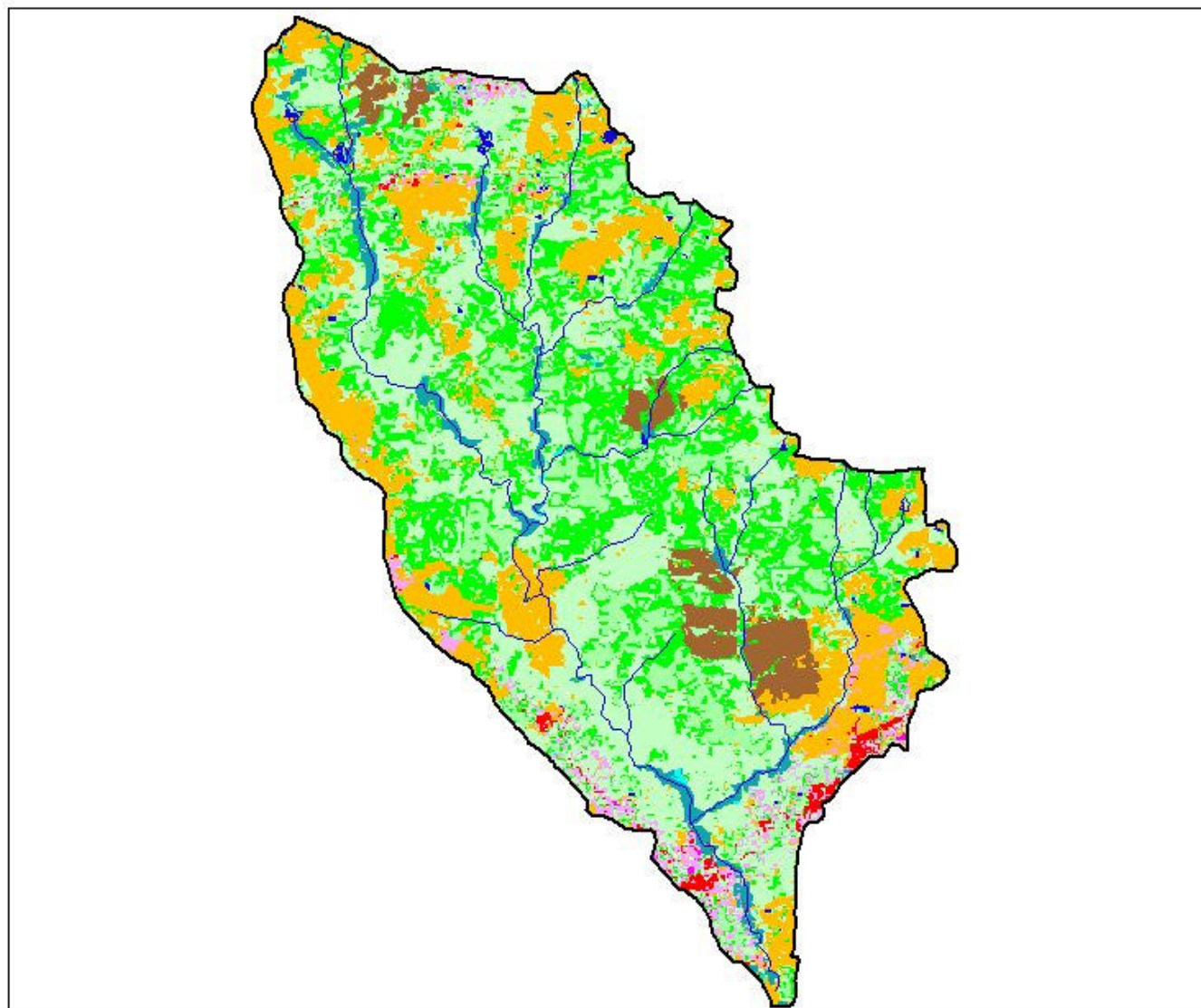
Data Categories

- Watershed physiographic data
- Hydrographic data
- Weather data
- Watershed activities/use data and information related to **Pollutant** production
- Point sources and direct discharge data and information
- Environmental monitoring data
- Stream flow data

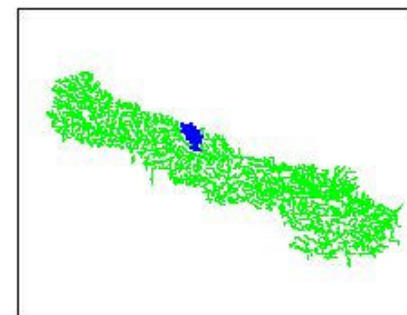
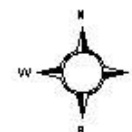
Watershed physiographic data:

Description	Potential Source(s)
Watershed boundary	USGS, DEQ
Land use/land cover	USGS, DCR
Soil data (SSURGO, STATSGO)	USDA, NRCS
Topographic data (USGS-30 meter DEM, USGS Quads)	USGS, DCR

Roses Creek - Land Use (NLCD)



- Watershed Boundary
- Roses Creek
- NLCD Data
 - Commercial/Industrial/Transportation
 - Low Intensity Residential
 - High Intensity Residential
 - Barren
 - Transitional
 - Urban/Recreational Grasses
 - Deciduous Forest
 - Evergreen Forest
 - Mixed Forest
 - Pasture/Hay
 - Row Crops
 - Woods/Wetlands
 - Emergent Herbaceous Wetlands
 - Open Water



2 0 2 4 Miles

Hydrographic data:

Description	Potential Source(s)
Stream network and reaches (RF3)	BASINS, DEQ
Stream Channel Morphology	Field Survey

Weather data:

Description	Potential Source(s)
Hourly meteorological conditions	NOAA NCDC, Earth Info, local airports, weather stations, and colleges and universities

Watershed activities/uses data and information related to **fecal coliform** production:

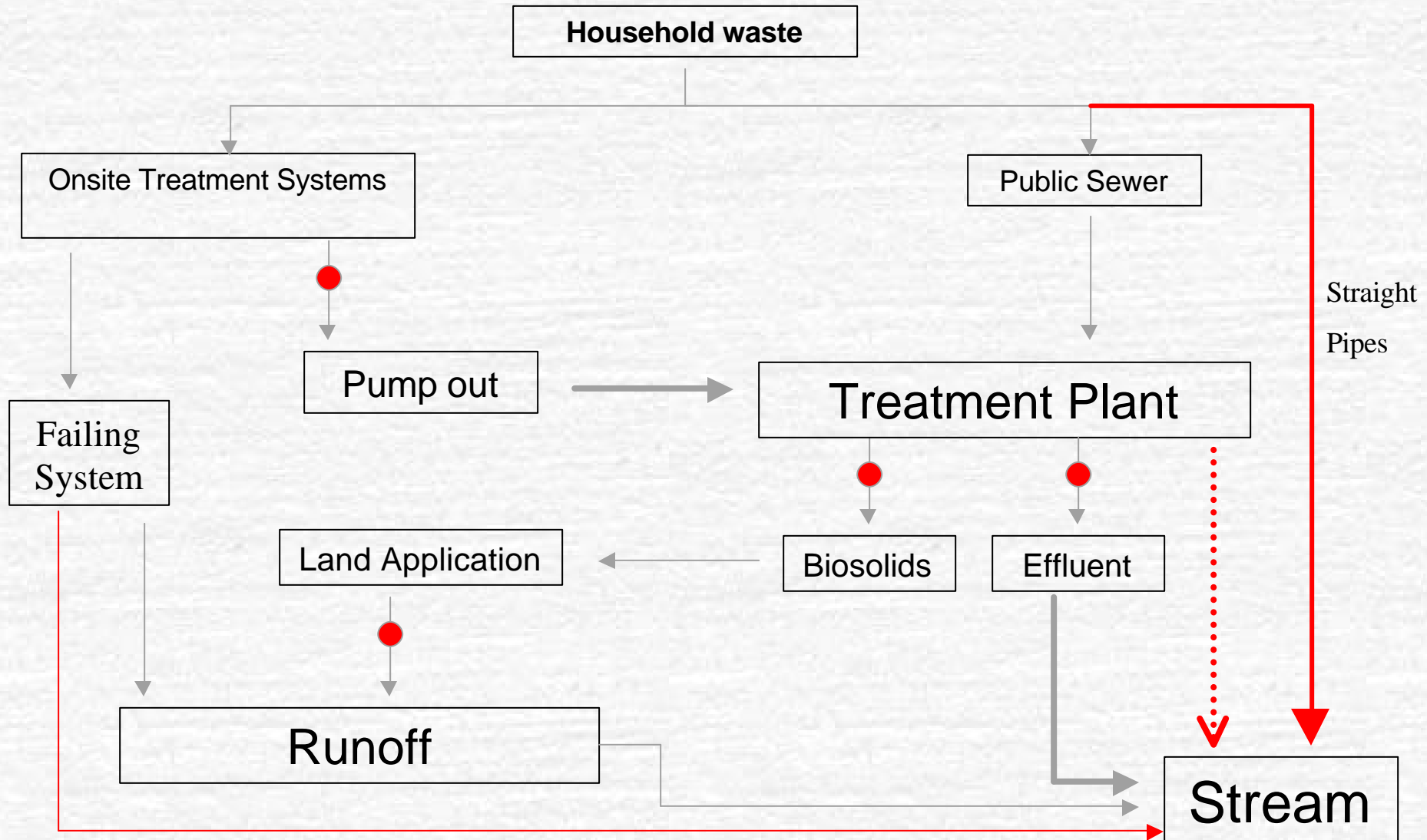
Compile information, data, reports, and maps that can be used to support fecal coliform source identification and loading.

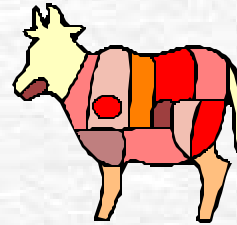
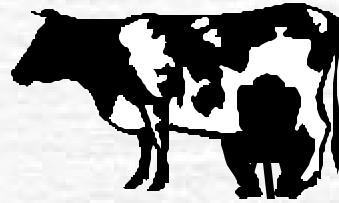
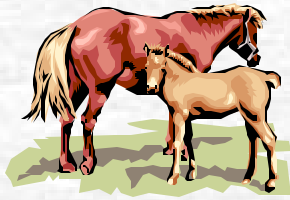
Address the following issues:

- Fecal Coliform loading from Human Sources
 - Straight pipes
 - Septic systems
 - Biosolids
- Fecal Coliform loading from Livestock
 - Livestock inventory
 - Livestock grazing and stream access
 - Confined animal facilities
 - Manure management
- Fecal coliform loading from Wildlife
 - Wildlife Inventories
- Fecal Coliform loading from Pets
 - Pet Inventories
- Best management practices (BMPs)

Human Contribution

● Fecal Coliform Decay





Livestock

Pasture

Confinement

Manure Storage

Manure Spreading

Pasture

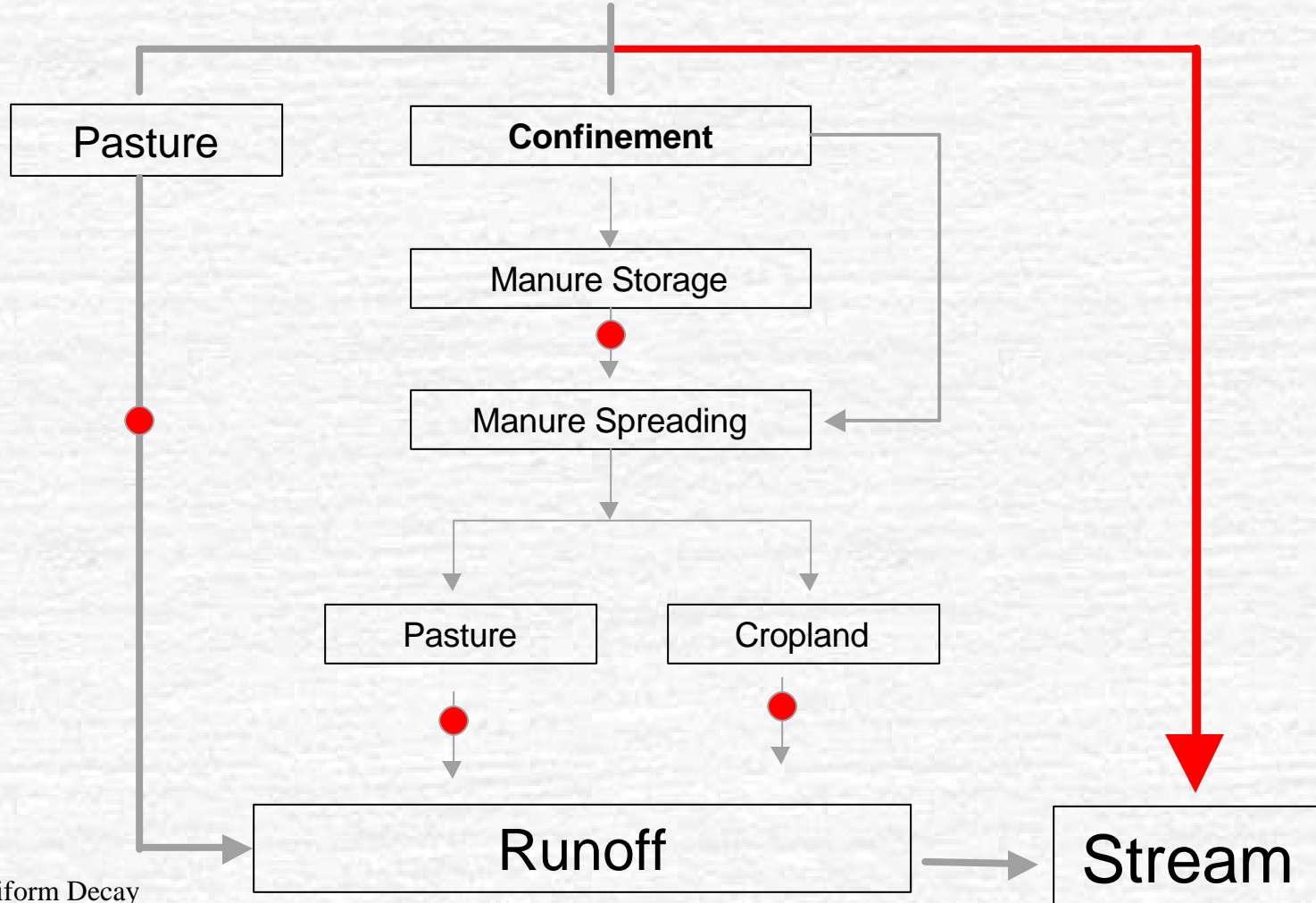
Cropland

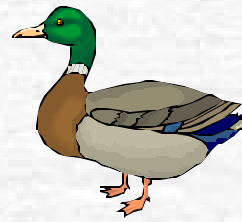
Runoff

Stream



Fecal Coliform Decay





Wildlife

Pasture

Cropland

Forest

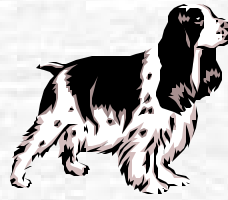
Built-up area

Runoff

Stream

● Fecal Coliform Decay





Pets: Dogs

Pasture

Cropland

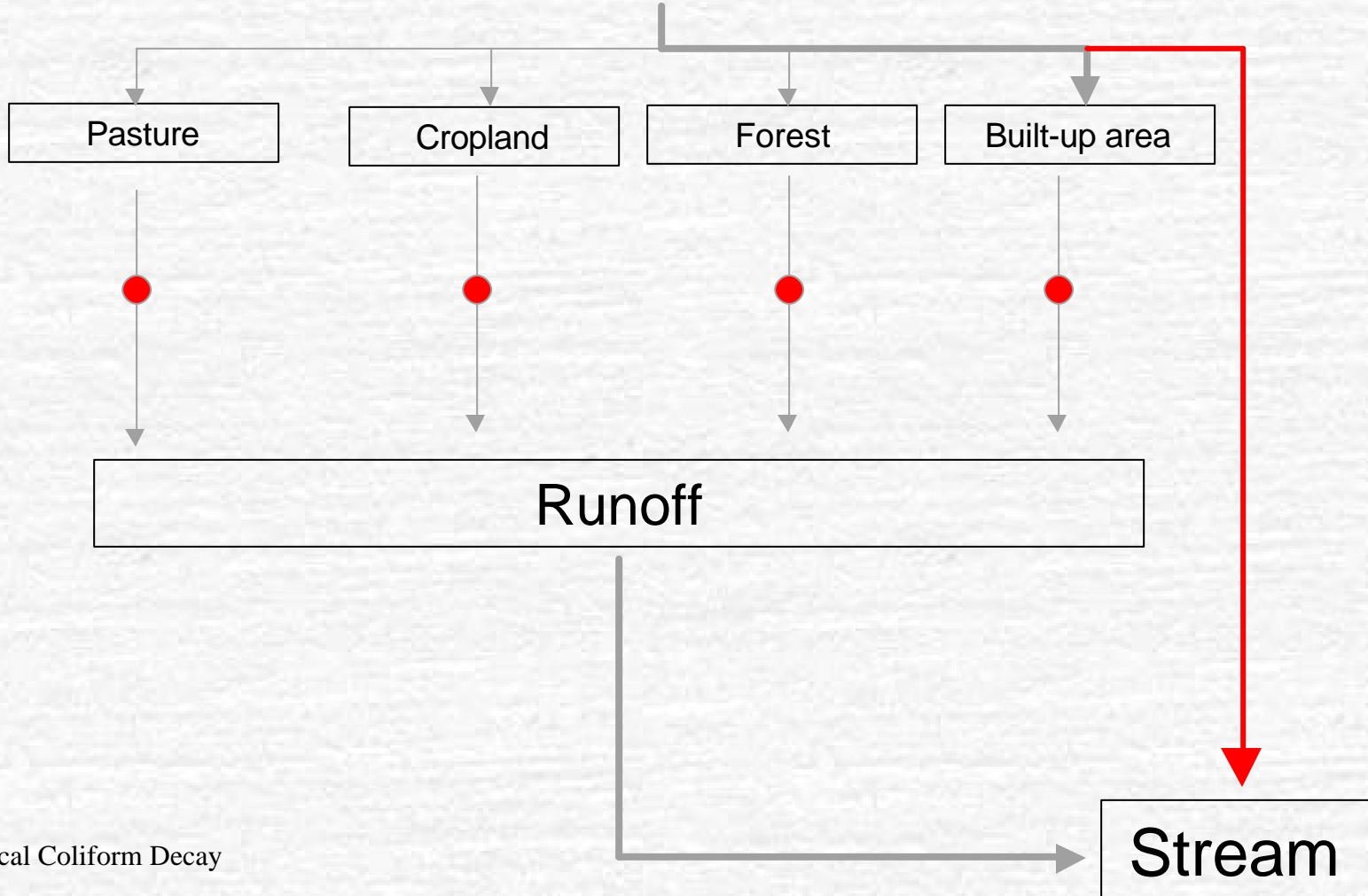
Forest

Built-up area

Runoff

Stream

● Fecal Coliform Decay



Watershed activities/uses data and information related to fecal coliform production:

Address the following issues:

- Septic systems
- Straight pipes
- Biosolids
- Livestock inventory
- Livestock grazing
- Livestock stream access
- Confined animal facilities
- Livestock confinement schedules
- Manure management
- Wildlife Inventories
- Pet Inventories
- Best management practices (BMPs)

Potential Source(s)

DCR, DEQ, VDGIF, USFWS, NRCS,
DCR HU database
Virginia Cooperative Extension Service, Farm
Service Agency,
Agricultural Census,
Soil and Water Conservation Districts, DCR
nutrient management specialists,
Farm Bureau,
Poultry Federation personal
Sewage treatment plants
County offices
Colleges and universities
Local project surveys
Windshield surveys
**Local knowledge based on communications
with producers, and local groups and
stakeholders**

Point sources and direct discharge data and information:

Description	Potential Source(s)
Permitted facilities locations and discharge monitoring reports (DMR)	US EPA Permit Compliance System (PCS), Virginia Pollutant Discharge Elimination System (VPDES), DEQ

Environmental monitoring data:

Description	Potential Source(s)
Station locations and ambient instream monitoring data	DEQ
Bacteria Source Tracking (BST)	DEQ
Special Studies	Colleges and universities, Local project surveys, Local knowledge based on communications with producers, and local groups and stakeholders

Stream flow data:

Description	Potential Source(s)
Gaging station location and continuous flow data	USGS, DEQ

Next Steps

- Identify data needs
- Collect available data
- Analyze data to investigate the impairment in the watershed
- Source loading estimates
- Develop the watershed model input parameters

Water Quality Data Analysis

- Locations of sources and WQ Stations
- Data Analysis
 - Flow and pollutants relations and trends
 - Bacteria Source Tracking (BST)

Sources Loading estimates

- Determine the daily fecal coliform production by source
- Estimate the size/number of each source
- Determine whether the source is
 - Direct Source
 - Indirect Source
- Calculate the load to each land use based on a monthly schedule and for each source
- The sum of all the individual sources is the total load

Data Needs

- Sewered/Unsewered Watershed
 - Population in watershed
 - Septic systems
 - Number and conditions
- Livestock inventory
 - Population estimates
 - Manure management
 - Storage
 - Application rates and locations
- Wildlife inventory
 - Habitat Inventory
 - Populations
- Stream flow data

**Roses Creek
Total Maximum Daily Load (TMDL)**

Data Contact Sheet

Name: _____
Organization: _____
Address: _____

Phone: _____
E-mail: _____

Please indicate available data from the following data types:

- ☐ Physiographic data (watershed boundary, land use/land cover, soil, topographic)
- ☐ Hydrographic data (stream network, stream channel morphology)
- ☐ Watershed activities/use data
 - ☐ Septic systems/Straight pipes
 - ☐ Biosolids (land application of biosolids)
 - ☐ Livestock (inventories, grazing, stream access, confined animal facilities, livestock confinement schedules, manure management)
 - ☐ Wildlife inventories
 - ☐ Pet inventories
 - ☐ Best management practices (BMPs)
- ☐ Point source data (direct discharges)
- ☐ Monitoring data (monitoring, station locations)
- ☐ Stream flow data
- ☐ Other

Comments:
